App. No.: 10/709971
Filed: 6/10/2004
Conf. No.: 3970

IN THE CLAIMS

1. (Presently Amended) A DC electric machine comprising a shaft rotatable about an axis, a plurality of circumferentially spaced permanent magnets disposed around said axis, a plurality of circumferentially spaced magnetic pole teeth facing said permanent magnets, electrical coils wound on said magnetic pole teeth, a plurality of circumferentially spaced commutator segments having clearances between adjacent edges to which ends of said coil windings are connected, and a plurality of brushes in sliding contact with said commutator segments for the transfer of electrical energy between said coils and said brushes, said coil ends being connected to selected of said commutator segments so that the instantaneous electrical energy ~~flows~~ flowing through adjacent coil pairs in the same circuit is in opposite directions upon rotation of said machine.

2. (Original) A DC electric machine as set forth in claim 1, wherein the coil ends of adjacent pairs are connected to commutator segments that are spaced from each other by at least two commutator segments that are not connected to any coil winding.

3. (Original) A DC electric machine as set forth in claim 1, wherein both ends of the winding of each coil winding are connected to the commutator segments, across each other and across one end of the winding of an adjacent coil winding.

4. (Original) A DC electric machine as set forth in claim 1, wherein the number m of permanent magnets is an even number of four or more, the number t of the magnetic pole teeth is m+2, the number s of the commutator segments is 2t and the number b of the brushes is m.

5. (Amended) A DC electric machine as set forth in claim ~~4~~ 1, wherein the number m of the magnets is four, the number t of the magnetic pole teeth is six, the number s of the segments is twelve, and the number b of the brushes is two, three or four.

6. (Original) A DC electric machine as set forth in claim 5, wherein the coil ends of adjacent pairs are connected to commutator segments that are spaced from each other by at least two commutator segments that are not connected to any coil winding.

7. (Previously Submitted) A DC electric machine as set forth in claim 6, wherein each of the 12 commutator segments is connected in parallel to another commutator segment spaced six segments from it.

8. (Original) A DC electric machine as set forth in claim 2, further including a second series of coil windings formed around each of the pole teeth and connected to the commutator segments that are not connected to the first mentioned series of coil windings.

9. (Presently Amended) A DC electric machine as set forth in claim 8, wherein the instantaneous electrical energy ~~flows~~ flowing through adjacent coil pairs in the second series of coils is in opposite directions ~~upon~~ during rotation of said machine.

10. (Original) A DC electric machine as set forth in claim 9, wherein the number m of permanent magnets is an even number of four or more, the number t of the magnetic pole teeth is m+2, the number s of the commutator segments is 2t and the number b of the brushes is m.

11. (Previously Submitted) A DC electric machine as set forth in claim 9, wherein the number m of the magnets is four, the number t of the magnetic pole teeth is six, the number s of the segments is twelve, and the number b of the brushes is two, three or four.

12. (Original) A DC electric machine as set forth in claim 1, wherein the machine comprises an electric motor.

13. (Original) A DC electric motor as set forth in claim 12, wherein the coil ends of adjacent pairs are connected to commutator segments that are spaced from each other by at least two commutator segments that are not connected to any coil winding.

14. (Original) A DC electric motor as set forth in claim 12, wherein both ends of the winding of each coil winding are connected to the commutator segments, across each other and across one end of the winding of an adjacent coil winding.

15. (Original) A DC electric motor as set forth in claim 12, wherein the number m of permanent magnets is an even number of four or more, the number t of the magnetic pole teeth is m+2, the number s of the commutator segments is 2t and the number b of the brushes is m.

16. (Previously Submitted) A DC electric motor as set forth in claim 12, wherein the number m of the magnets is four, the number t of the magnetic pole teeth is six, the number s of the segments is twelve, and the number b of the brushes is two, three or four.

17. (Original) A DC electric motor as set forth in claim 16, wherein the coil ends of adjacent pairs are connected to commutator segments that are spaced from each other by at least two commutator segments that are not connected to any coil winding.

18. (Original) A DC electric motor as set forth in claim 17, wherein the each of the 12 commutator segments is connected in parallel to another commutator segment spaced six segments from it.

19. (Original) A DC electric motor as set forth in claim 13, further including a second series of coil windings formed around each of the pole teeth and connected to the commutator segments that are not connected to the first mentioned series of coil windings.

20. (Currently Amended) A DC electric motor as set forth in claim 19, wherein the instantaneous electrical energy ~~flows~~ flowing through adjacent coil pairs in the second series of coils is in opposite directions ~~upon~~ during rotation of said machine.

21. (Original) A DC electric motor as set forth in claim 20, wherein the number m of permanent magnets is an even number of four or more, the number t of the magnetic pole teeth is m+2, the number s of the commutator segments is 2t and the number b of the brushes is m.

22. (Previously Amended) A DC electric motor as set forth in claim 20, wherein the number m of the magnets is four, the number t of the magnetic pole teeth is six, the number s of the segments is twelve, and the number b of the brushes is two, three or four.